

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) Magnetic particles capable of binding a target substance, which comprise a magnetic material and a matrix material, wherein the magnetic material is remanent upon exposure to a magnetic field and the matrix material has a surface comprising functional groups which promote disaggregation of the particles in the presence of a liquid phase.

2. (Original) Magnetic particles according to claim 1, wherein the magnetic material comprises a magnetic metal oxide.

3. (Original) Magnetic particles according to claim 2, wherein the magnetic metal oxide comprises an iron oxide in which, optionally, all or a part of the ferrous iron thereof is substituted by a divalent transition metal selected from cadmium, chromium, cobalt, copper, magnesium, manganese, nickel, vanadium, and/or zinc.

4. (Currently Amended) Magnetic particles according to ~~any of claims 1 to 3~~claim 1, wherein the magnetic material comprises a ferrimagnetic material.

5. (Original) Magnetic particles according to claim 4, wherein the ferrimagnetic metal oxide comprises ferrimagnetic magnetite.

6. (Currently Amended) Magnetic particles according to ~~any of claims 1 to 3~~claim 1, wherein the magnetic material comprises a ferromagnetic material.

7. (Currently Amended) Magnetic particles according to ~~any preceding claim~~claim 1, the length or diameter of which is in the range 0.1 to 5000µm.

8. (Currently Amended) Magnetic particles according to ~~any preceding claim~~claim 1, which are substantially spherical.

9. (Currently Amended) Magnetic particles according to ~~any preceding claim~~claim 1, wherein the matrix material comprises a polymer.

10. (Original) Magnetic particles according to claim 9, wherein the polymer comprises an organic polymer or a silica-based polymer.

11. (Currently Amended) Magnetic particles according to ~~any preceding claim~~claim 1, wherein the functional groups of the matrix material are hydrophilic for use with an aqueous liquid phase.

12. (Currently Amended) Magnetic particles according to ~~any of claims 1 to 10~~claim 1, wherein the functional groups of the matrix material are hydrophobic for use with a non-polar liquid phase.

13. (Currently Amended) Magnetic particles according to ~~any preceding claim~~claim 1, wherein the matrix material further comprises an affinant for binding the target substance.

14. (Currently Amended) Magnetic particles according to ~~any preceding claim~~claim 1, wherein the target substance is a nucleic acid.

15. (Original) Magnetic particles according to claim 13, wherein the affinant is capable of binding a cell, a protein, a virus or a prion.

16. (Original) Magnetic particles according to claim 15, wherein the affinant comprises an antibody, a binding protein, a fragment of an antibody or binding protein, or a ligand.

17. (Original) Magnetic particles according to claim 16, wherein the affinant comprises a binding protein which comprises an avidin for binding to a target substance which, is biotinylated, or the affinant comprises biotin and the target substance is avidinylated.

18. (Original) Magnetic particles according to claim 16, wherein the affinant comprises a ligand which comprises an oligonucleotide or a metal chelate specific for the target substance.

19. (Currently Amended) Magnetic particles according to ~~any of claims 15 to 18~~ claim 15, wherein the cell or protein is microbial.

20. (Original) Magnetic particles according to claim 13, wherein the target substance comprises a metal and the affinant comprises a chelator for the metal.

21. (Original) Magnetic particles according to claim 12, wherein the hydrophobic functional groups are capable of binding microorganisms or hydrophobic target substances.

22. (Original) A process for the preparation of magnetic particles capable of binding a target substance, which comprises providing an unmagnetised magnetic material, and providing a matrix material so as to form magnetic particles, wherein the magnetic material is remanent upon exposure to a magnetic field and the matrix material has a surface comprising functional groups which promote disaggregation of the particles in the presence of a liquid phase.

23. (Original) A process according to claim 22, wherein the matrix material comprises a polymer.

24. (Original) A process according to claim 23, wherein the polymer comprises an organic polymer or a silica-based polymer.

25. (Currently Amended) A process according to ~~any of claims 22 to 24~~claim 22, wherein the matrix material is provided preformed and added to the magnetic material.

26. (Original) A process according to claim 24, wherein the polymer is provided by polymerisation of a monomer in the presence of the unmagnetised magnetic material to form the magnetic particles comprising the magnetic material and a polymeric material.

27. (Original) A process according to claim 26, wherein the monomer comprises an organic monomer or a silica-based monomer.

28. (Currently Amended) A process according to ~~claim 26 or claim 27~~, wherein the step of polymerisation comprises a step-growth condensation and/or a radical reaction.

29. (Currently Amended) A process according to ~~any of claims 26 to 28~~claim 26, wherein the step of polymerisation takes place in an emulsion and the unmagnetised magnetic material is present in a discontinuous phase of the emulsion.

30. (Original) A process according to claim 29, wherein the step of polymerisation takes place in the discontinuous phase of the emulsion.

31. (Currently Amended) A process according to ~~claim 29 or claim 30~~claim 29, wherein the monomer is present in a continuous phase of the emulsion, prior to polymerisation.

32. (Original) A process according to claim 31, wherein the monomer comprises an organic monomer and the emulsion is a water-in-oil emulsion.

33. (Original) A process according to claim 31, wherein the monomer comprises a silica-based monomer and the emulsion is an oil-in-water emulsion.

34. (Currently Amended) A process according to ~~any of claims 26 to 28~~claim 26, wherein the step of polymerisation takes place in a solution.

35. (Currently Amended) A process according to ~~any of claims 22 to 34~~claim 22, wherein the magnetic material comprises particles, the length or diameter of which is in the range 100 to 300nm.

36. (Currently Amended) A process according to ~~any of claims 22 to 35~~claim 22, wherein the magnetic particles are ~~as defined in any of claims 1 to 21~~capable of binding a target substance, which comprise a magnetic material and a matrix material, wherein the magnetic material is remanent upon exposure to a magnetic field and the matrix material has a surface comprising functional groups which promote disaggregation of the particles in the presence of a liquid phase.

37. (Currently Amended) Use of magnetic particles according to ~~any of claims 1 to 21 or obtainable by a process according to any of claims 22 to 36~~claim 1, for separating a target substance from a sample containing such a target substance.

38. (Currently Amended) Use of magnetic particles according to ~~any of claims 1 to 13, or 15 to 19~~claim 1, for separating a target substance comprising a cell, a microorganism, or a protein from a sample containing such a target substance.

39. (Currently Amended) Use of magnetic particles according to ~~any of claims 1 to 13, or 20~~claim 1, for separating a target substance comprising a metal from a sample containing such a target substance.

40. (Currently Amended) Use of magnetic particles according to ~~any of claims 1 to 13, or 21~~claim 1, for separating a target substance comprising an organic compound from a sample containing such a target substance.

41. (Currently Amended) Use of magnetic particles according to ~~any of claims 1 to 14~~claim 1, for separating a target substance comprising a nucleic acid from a sample containing such a target substance.

42. (Currently Amended) Use according to ~~any of claims 37 to 41~~claim 37, wherein the target substance is isolated from the sample.

43. (Currently Amended) Use according to ~~any of claims 37 to 41~~claim 37, wherein the target substance is depleted from the sample.

44. (Currently Amended) Use of magnetic particles according to ~~any of claims 1 to 13, or 15 to 19~~claim 1, in a cell sorting apparatus.

45. (Original) A process for separating a target substance from a target substance containing sample, which comprises:

(a) providing target substance binding magnetic particles which comprise a magnetic material and a matrix material, wherein the magnetic material is remnant upon exposure to a magnetic field;

(b) providing a liquid phase comprising the target substance-containing sample;

(c) dispersing the sample with the magnetic particles so as to bind the target substance thereto; and

(d) isolating the particles from the sample by applying a magnetic field thereto and separating the particles from the liquid phase.

46. (Original) A process according to claim 45, wherein the step of dispersing the sample with the magnetic particles comprises subjecting the magnetic particles to disruption to disaggregate the particles.

47. (Original) A process according to claim 46, wherein the disruption comprises mechanical disruption selected from pipetting, stirring, vortexing and/or shaking, sonication or UV disruption.

48. (Currently Amended) A process according to ~~any of claims 45 to 47~~claim 45, wherein the magnetic particles are ~~as defined in any of claims 1 to 21, or obtainable by a process as defined in any of claims 22 to 36~~capable of binding a target substance, which comprise a magnetic material and a matrix material, wherein the magnetic material is remanent upon exposure to a magnetic field and the matrix material has a surface comprising functional groups which promote disaggregation of the particles in the presence of a liquid phase.

49. (Currently Amended) A process according to ~~any of claims 45 to 48~~claim 45, wherein the magnetic particles are ~~as defined in any of claims 1 to 13, or 15 to 19~~capable of binding a target substance, which comprise a magnetic material and a matrix material, wherein the magnetic material is remanent upon exposure to a magnetic field and the matrix material has a surface comprising functional groups which promote disaggregation of the particles in the presence of a liquid phase, and the target substance comprises a cell, a microorganism, or a protein.

50. (Currently Amended) A process according to ~~any of claims 45 to 48~~claim 45, wherein the magnetic particles are ~~as detailed in any of claims 1 to 13, or 20~~capable of binding a target substance, which comprise a magnetic material and a matrix material, wherein the magnetic material is remanent upon exposure to a magnetic field and the matrix material has a surface comprising functional groups which promote disaggregation of the particles in the presence of a liquid phase, and the target substance comprises a metal.

51. (Currently Amended) A process according to ~~any of claims 45 to 48~~claim 45, wherein the magnetic particles are ~~as defined in any of claims 1 to 13, or 21~~capable of binding a target substance, which comprise a magnetic material and a matrix material, wherein the magnetic material is remanent upon exposure to a magnetic field and the matrix material has a surface comprising functional groups which promote disaggregation of the particles in the presence of a liquid phase, and the target substance comprises an organic compound.

52. (Currently Amended) A process according to ~~any of claims 45 to 48~~claim 45, wherein the magnetic particles are ~~as defined in any of claims 1 to 14~~capable of binding a target substance, which comprise a magnetic material and a matrix material, wherein the magnetic material is remanent upon exposure to a magnetic field and the matrix material has a surface comprising functional groups which promote disaggregation

International Application No.: PCT/IB2003/002994

International Filing Date: July 1, 2003

U.S. Application No. 10/519,167

Preliminary Amendment

of the particles in the presence of a liquid phase, and the target substance comprises a nucleic acid.

53. (Original) A process according to claim 52, wherein the sample comprises unfractionated nucleic acid.

54. (Currently Amended) A process according to ~~any of claims 45 to 53~~claim 45, wherein the target substance is isolated from the sample.

55. (Currently Amended) A process according to ~~any of claims 45 to 53~~claim 45, wherein the target substance is a contaminant which is depleted from the sample.